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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

HOPKINS, ROBERT A

ART UNIT	PAPER NUMBER
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1724

DATE MAILED: 01/17/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/754,837

Applicant(s)

FRIDAY ET AL.

Examiner

Robert A. Hopkins

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-55 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1, 6, 9, 10, 13-20, 22-30, 32-40, 43, 45-51 and 53 is/are rejected.
- 7) ☒ Claim(s) 2-5, 7, 8, 11, 12, 21, 31, 41, 42, 44, 52, 54 and 55 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>1-12-04</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Claim Objections

Claims 10, 47, 48 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim.

Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form.

Claim 10 recites a statement of the operation of the filter system, but does not further limit structure of the filter system.

Claims 47 and 48 recite a statement of the operation of the filter system, but does not further limit structure of the filter system.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 6, 9, 10, 13-20 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Dow(3109722).

Dow teaches a regenerable filter system comprising a flow path along which a stream of fluid flows between an inlet(11) and an outlet(24), a first filtering unit in the flow path between the inlet and the outlet, the first unit comprising first and second regenerable filter beds(A, A-1), each bed including a first adsorbent for removing a first

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contaminant from the stream of fluid, a first valve(three way selector inlet valve 12) located between the inlet and the first and second filter beds for selectively directing the stream of fluid through one of the first and second filter beds, the other of the first and second filter beds being removed from the flow path, a second filtering unit in the flow path between the first filtering unit and the outlet, the second unit being located downstream from the first unit and including third and fourth regenerable filter beds(B, B-1), each bed including a second adsorbent for removing a second contaminant from the stream of fluid, a second valve(16) located between the first filtering unit and the third and fourth filter beds for selectively directing the stream of fluid through one of the third and fourth filter bed, the other of the third and fourth filter beds being removed from the flow path, and a controller(column 4 lines 8-14), the controller operating the first flow valve to direct the stream of fluid through a desired one of the first and second filter bed and operating the second valve to direct a stream of fluid through a desired one of the third and fourth beds, wherein the first and second filtering units are operated independent of one another.

Dow further teaches a third valve(20) in the flow path between the second filter unit and the outlet, the third valve selectively directing the stream of fluid from one of the third and fourth filter beds to the outlet. Dow further teaches wherein the controller controls first and second regeneration cycles for the first and second filtering units. Dow further teaches an air pressuring member(not shown) upstream from the first valve. Dow further teaches wherein the first and second filter beds each house a set amount of the first adsorbent and the third and fourth beds each house a set amount of the second

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adsorbent, the set amount of the first adsorbent being unequal to the set amount of the second adsorbent(column 9 lines 1-7). Dow further teaches where the first and second bed each have a filter housing with a first length and the third and fourth filter beds each have a filter housing with a second length, the first length and second length being unequal.. Dow further teaches an inline temperature controller in the flow path for maintaining the stream of fluid at a specified temperature as it enters the first filtering unit(column 4 lines 11-12). Dow further teaches wherein the first and second adsorbents comprise temperature swing adsorbents, the first and second filter beds being regenerated at a first regeneration temperature, and the third and fourth filter bed being regenerated at a second regeneration temperature. Dow further teaches a first temperature sensor in the first filter bed and a second temperature sensor(sensors not shown), the first and second temperature sensors being in communication with the controller and one of the first and second sensors governing a regeneration cycle of the first filter unit. Dow further teaches a third temperature sensor in the third filter bed and a fourth temperature sensor(sensors not shown), the third and fourth temperature sensors being in communication with the controller and one of the third and fourth sensors governing a regeneration cycle of the first filter unit. Dow further teaches wherein the first and second adsorbents comprise a material selected from silica gels, alumina silicates, activated carbons, polymeric resins, and combinations thereof.

Claims 22-30,32-40,43 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Dow(3109722).

Dow teaches a method of removing at least a first and second contaminant from a stream of fluid, the method including providing the stream of fluid(11), directing the stream of fluid through a filtering system having a first filtering unit with first and second regenerable filters(A,A-1) and a second filtering unit with third and fourth regenerable filter beds(B,B-1), the first and second filtering units being in fluid connection with one another, filtering a first contaminant from the stream of fluid in the first filtering unit, filtering a second contaminant from the stream of fluid in the second filtering unit, regenerating one of the first and second filter bed of the first filtering unit, and regenerating one of the third and fourth filter beds of the second filtering unit independent of the step of regenerating one of the first and second filter beds. Dow further teaches the step of changing the temperature of the stream of fluid. Dow further teaches the step of cooling the stream of fluid. Dow further teaches the step of heating the stream of fluid. Dow further teaches a step of regulating a duration of the step of regenerating the one of the first and second filter beds of the first filtering unit by sensing temperature in the first and second filter beds. Dow further teaches a step of regulating a duration of the step of regenerating the one of the third and fourth filter beds of the first filtering unit by sensing temperature in the third and fourth filter beds. Dow further teaches regenerating the first second filter bed is for a first regeneration cycle and regenerating the third and fourth filter beds is for a second regeneration cycle, the first and second regeneration cycles being unequal in duration. Dow further teaches the step of controlling the first and second regeneration cycles based on at least one physical characteristic(temperature) of the respective first and second filter beds. Dow

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further teaches wherein one of the first and second contaminants is a high boiling vapor chemical. Dow further teaches wherein the other of the first and second contaminants is a low boiling vapor chemical. Dow further teaches wherein the regenerating the one first and second filter beds comprises steps of heating a purge fluid(through heat exchanger 37), passing the purge fluid through one of the first and second filter beds, heating the one of the first and second filter beds, and extracting a chemical from the fluid. Dow further teaches the step of sensing temperature in the one first and second filter bed.. Dow further teaches the step of cooling the one first and second filter beds when the temperature sensed reaches a set point(column 8 lines 34-41). Dow further teaches the first regenerating cycle being about 60-180 minutes.

Claims 45-51,53 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Dow(3109722).

Dow teaches a regenerable filter system comprising a first flow path along which a stream of process fluid flows between a process fluid inlet and a process fluid outlet, a first filter unit in the first flow path, the first filter unit comprising a first regenerable filter having a first adsorbent(A) for removing a first contaminant from the stream of fluid, a second filter unit in the flow path, the second unit being located between the first unit and the outlet of the first flow path, the second unit comprising a second regenerable filter bed having a second adsorbent(B) for removing a second contaminant from the stream of fluid, a second flow path along which a stream of regeneration fluid flows between a regeneration fluid inlet and a regeneration fluid outlet, and a controller(not shown) for selectively directing the process fluid through the first flow path and the

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regeneration fluid through the second flow path, wherein a regeneration cycle of the first filter unit is independent of a regeneration cycle of the second filter unit. Dow further teaches wherein regeneration is thermal and the regeneration temperatures of the first and second filter units are different. Dow further teaches a first valve(12) located between the process fluid inlet and the first filter unit in the flow path and between the regeneration fluid outlet and the first filter unit in the second flow path, and a second valve(16) located between the first filter unit and second filter unit, the first and second valves directing the flow of process fluid and the regeneration fluid. Dow further teaches a third valve(27) located between the regeneration fluid inlet and second filter unit in the second flow path and between the process fluid outlet and the second filter unit in the first flow path, the third valve further directing the flow of the process fluid and the regeneration fluid. Dow further teaches a temperature control system for maintaining a desired temperature of the process fluid. Dow further teaches a first heater for heating the regeneration fluid to a desired regeneration temperature, wherein regeneration is a thermal regeneration. Dow further teaches a pressurization system for the process fluid.

Allowable Subject Matter

Claims 2-5,7,8,11,12,21,31,41,42,44,52,54,55 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claim 2 recites "further including a bypass loop for bypassing at least one of the first and second filter beds, the bypass loop including an upstream valve and a downstream valve for preventing fluid flow through the one filter bed". Dow fails to teach a bypass loop. It would not have been obvious to someone of ordinary skill in the art at the time of the invention to provide a bypass loop in the filter system of Dow because Dow does not suggest such a modification. Claim 3 depends on claim 2 and hence would also be allowable upon incorporation of claim 2 into claim 1.

Claim 4 recites "further including a first heat exchanger in the flow path between said first filter bed and said second valve, said first heat exchanger producing a regeneration heat necessary to regenerate said first filter bed". Dow fails to teach a first heat exchanger. It would not have been obvious to someone of ordinary skill in the art at the time of the invention to provide a first heat exchanger in the flow path between the first filter bed and the second valve, the first heat exchanger producing a regeneration heat necessary to regenerate the first filter bed because Dow does not suggest such a modification. Claim 5 depends on claim 4 and hence would also be allowable upon incorporation of claim 4 into claim 1.

Claim 7 recites "further including a third heat exchanger in the flow path between said third filter bed and said third valve, said third heat exchanger producing a regeneration heat necessary to regenerate said third filter bed". Dow fails to teach a third heat exchanger. It would not have been obvious to someone of ordinary skill in the art at the time of the invention to provide a third heat exchanger in the flow path between the third filter bed and the third valve, the third heat exchanger producing a

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regeneration heat necessary to regenerate the third filter bed because Dow does not suggest such a modification. Claim 8 depends on claim 7 and hence would also be allowable upon incorporation of claim 7 and 6 into claim 1.

Claim 11 recites "further including a device in said flow path between said inlet and said first filtering unit for removing a portion of said moisture from said stream of fluid". Dow fails to teach a device in said flow path between said inlet and said first filtering unit for removing a portion of said moisture from said stream of fluid. It would not have been obvious to someone of ordinary skill in the art at the time of the invention to provide a device in said flow path between said inlet and said first filtering unit for removing a portion of said moisture from said stream of fluid because Dow does not suggest such a modification. Claim 12 depends on claim 11 and hence would also be allowable upon incorporation of claim 11 into claim 1.

Claim 21 recites "wherein at least one of said first and second adsorbents includes more than one adsorbent material". Dow teaches a single adsorbent in each filter bed. It would not have been obvious to someone of ordinary skill in the art at the time of the invention to provide at least one of said first and second adsorbents which includes more than one adsorbent material because Dow does not suggest such a modification.

Claim 31 recites "further including the step of changing the humidity of said stream of fluid". Dow fails to teach a step of changing the humidity of said stream of fluid. It would not have been obvious to someone of ordinary skill in the art at the time

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of the invention to provide changing the humidity of said stream of fluid because Dow does not suggest such a modification.

Claim 41 recites "wherein said regenerating comprises the steps of heating a filter bed at a first end thereof, sensing temperature of said filter bed between said first end and a second end, begin cooling said filter at said first end before said second end is heated to a predetermined temperature". Dow fails to teach a step of heating a filter bed at a first end thereof, sensing temperature of said filter bed between said first end and a second end, begin cooling said filter at said first end before said second end is heated to a predetermined temperature. It would not have been obvious to someone of ordinary skill in the art at the time of the invention to provide a step of heating a filter bed at a first end thereof, sensing temperature of said filter bed between said first end and a second end, begin cooling said filter at said first end before said second end is heated to a predetermined temperature because Dow does not suggest such a modification.

Claim 42 recites "further including the step of maintaining said stream of fluid at a relative humidity of between 30% and 45% before said step of directing said stream of fluid". Dow fails to teach a step of maintaining said stream of fluid at a relative humidity of between 30% and 45% before said step of directing said stream of fluid. It would not have been obvious to someone of ordinary skill in the art at the time of the invention to provide a step of maintaining said stream of fluid at a relative humidity of between 30% and 45% before said step of directing said stream of fluid because Dow does not suggest such a modification.

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Claim 44 recites "wherein said first filtering unit includes a bypass loop and said regenerating said one of said third and fourth filter beds of said second filtering unit includes the step of bypassing said first filtering unit". Dow fails to teach a first filtering unit which includes a bypass loop. It would not have been obvious to someone of ordinary skill in the art at the time of the invention to provide a first filtering unit which includes a bypass loop because Dow does not suggest such a modification.

Claim 52 recites "further comprising a humidity control system for regulating a humidity of said process fluid". Dow fails to teach a humidity control system. It would not have been obvious to someone of ordinary skill in the art at the time of the invention to provide a humidity control system because Dow does not suggest such a modification.

Claim 54 recites "further comprising a second heater for heating said regeneration fluid to a desired temperature, wherein said first heater is located adjacent said first filter unit and said second heater is located adjacent said second filter unit. Dow teaches a heater(25), but does not teach a second heater for heating said regeneration fluid to a desired temperature, wherein said first heater is located adjacent said first filter unit and said second heater is located adjacent said second filter unit. It would not have been obvious to someone of ordinary skill in the art at the time of the invention to provide a second heater for heating said regeneration fluid to a desired temperature, wherein said first heater is located adjacent said first filter unit and said second heater is located adjacent said second filter unit because Dow does not suggest such a modification.

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Claim 55 recites "wherein said first heater comprises a heat exchanger". Dow teaches an ordinary heating element heater. It would not have been obvious to someone of ordinary skill in the art at the time of the invention to provide a first heater which comprises a heat exchanger because Dow does not suggest such a modification.


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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Robert A. Hopkins whose telephone number is 571-272-1159. The examiner can normally be reached on Monday-Friday, 7am-4pm, alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Duane Smith can be reached on 571-272-1166. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Rah
January 11, 2006


ROBERT A. HOPKINS
PRIMARY EXAMINER
A. U. 1724